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10/534,592	10/05/2005	David Anthony Barrow	930058-2004	6831

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EXAMINER

CHAUDRY, ATIF H

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3753

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/534,592	Applicant(s) BARROW ET AL.	
	Examiner ATIF H. CHAUDRY	Art Unit 3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-31,33-42,45-48 and 50 is/are pending in the application.
- 4a) Of the above claim(s) 23-27,29,30 and 37-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21,22,28,31,33-36,40-42,46-48 and 50 is/are rejected.
- 7) ☒ Claim(s) 45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Status of the claims

Applicant's amendment as filed on 04/28/2009 has been entered. The amendment cancelled claims 43 and 44; added claim 50 and amended claims 1, 31, 40 and 48.

Currently claims 21-31, 33-42, 45-48 and 50 are pending in this application and claims 23-27, 29-30, 37-39 are withdrawn.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 21, 22, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Takehiko (JP2002277478).

4. Regarding claims 21 and 22, Burns (Fig. 5-9) discloses a device comprising first and second inlet passages 9, 10 for respective immiscible fluids, the first and second

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inlet passages merging into a third passage 11 along which, in use, the two fluids flow under parallel laminar flow conditions (lines 9 & 10 are parallel in Fig. 9), the third passage 11 being formed with a discontinuity 1, in use, causing the two fluids to form into a flow of alternate segments. Burns fails to disclose the fluids flowing in intimate contact with each other. Takehiko (Fig. 1) teaches a microfluidic fluid flow device, comprising inlet passages 20A, 20B merging together causing the fluids from the first and second conduits flow parallel to one another and intimate contact with each other until they reach a discontinuity. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the device disclosed by Burns with a portion of the first and second inlet flows in parallel intimate contact with each other as taught by Takehiko in order to avoid mixing by preventing the fluid streams striking each other at an angle at the discontinuity.

5. Regarding claim 28, Burns (page 1, para 12) discloses a segmented flow device comprising pathways made of fluoropolymer to avoid sticking.

6. Claims 31, 33-35 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) and Ekstrom et al. (US Patent 5376252) further in view of Mets et al. (US Patent 3537889).

7. Regarding claims 31, 33, 34, and 48, Burns (Fig. 5-9) discloses a method of producing segmented flow using a device comprising a first conduit 11 provided with a discontinuity 1 where it splits into two parallel inlet passages 9, 10 which provide immiscible fluid to merge at the intersection and cause segmented flow downstream of

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the discontinuity. Burns fails to disclose two substrates disposed face-to-face. Kopf-Sill et al. (Fig. 4) teaches a segmented flow device comprising of flow channels made by two substrates disposed faced to face and surface of one substrate profiled to define conduits. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns, with two substrates as taught by Kopf-Sill et al. as a convenient method of defining conduits in substrates. Burns or Kopf-Sill et al. fail to disclose substrates encased in casement layers. Ekstrom et al. (Fig. 9) teaches two layers of substrates 21, 23 having fluid passages defined in between and encased by casement layers 24, 25. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with encasement layers as taught by Ekstrom et al. in order to provide an outer protection for the substrate layers and keep them together. Burns as modified fails to disclose substrates disposed in a cavity formed by casement layers. Mets et al. (Fig. 2) teaches substrates 14, 15 disposed in cavities 11, 12 formed between casement layers 10, 13. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with cavities in encasement layers as taught by Mets et al. in order to provide a convenient location for placement of substrates.

8. Regarding claim 35, Burns (page 1, para 12) discloses a segmented flow device comprising pathways made of fluoropolymer to avoid sticking.

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9. Claims 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Kopf-Sill et al. (US Patent 5957579), Ekstrom et al. (US Patent 5376252) and Mets et al. (US Patent 3537889) alone or further in view of Takehiko et al. (JP2002277478).

10. Burns fails to discuss different flow rates but the difference in size of slugs in Fig. 8 would result inherently from different flow rates. Takehiko et al. (Fig. 1) teaches a device for producing segmented fluid flow, comprising inlet passages 20A, 20B merging into a third passage 30 causing segmented flow. Takehiko et al. teaches different sized alternate segments in figures 2 and 4, which inherently imply different flow rates of the two fluids. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns with different flow rates in each inlet passage as taught by Takehiko et al. in applications requiring different sized segments.

11. Claims 40, 41, 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579) and Ekstrom et al. (US Patent 5376252) further in view of Mets et al. (US Patent 3537889).

12. Regarding claims 40 and 41, Burns (Fig. 5-9) discloses a device comprising first and second inlet passages 9, 10 for respective immiscible fluids, the first and second inlet passages merging into a third passage 11 along which, in use, the two fluids flow under parallel laminar flow conditions, the third passage 11 being formed with a discontinuity 1, in use, causing the two fluids to form into a flow of alternate segments.

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Burns (page 1, para 12) teaches a segmented flow device comprising pathways made of fluoropolymer to avoid sticking. Burns fails to disclose two substrates disposed face-to-face. Kopf-Sill et al. (Fig. 4) teaches a segmented flow device comprising of flow channels made by two substrates disposed faced to face and surface of one substrate profiled to define conduits. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns, with two substrates as taught by Kopf-Sill et al. as a convenient method of defining conduits in substrates. Burns or Kopf-Sill et al. fail to disclose substrates encased in casement layers. Ekstrom et al. (Fig. 9) teaches two layers of substrates 21, 23 having fluid passages defined in between and encased by casement layers 24, 25. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with encasement layers as taught by Ekstrom et al. in order to provide an outer protection for the substrate layers and keep them together. Burns fails to disclose substrates disposed in a cavity formed by casement layers. Mets et al. (Fig. 2) teaches substrates 14, 15 disposed in cavities 11, 12 formed between casement layers 10, 13. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with cavities in encasement layers as taught by Mets et al. in order to provide a convenient location for placement of substrates.

13. Regarding claim 47, Ekstrom et al. (Fig. 9) teaches access openings 26 in the casement layer for fluid access to the passages formed in the substrates.

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14. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579), Ekstrom et al. (US Patent 5376252) and Mets et al. (US Patent 3537889) further in view of Kennedy (US Patent 6509085).

15. Burns or Kopf-Sill et al. fail to disclose outer members holding the substrates. Kennedy (Fig. 2C) teaches a microfluidic device with outer clamps 220, 225 holding two substrates 5, 35 together. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with clamping means as taught by Kennedy in order to secure together the two substrates.

16. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (US PG Pub US 20030145894) in view of Kopf-Sill et al. (US Patent 5957579), Ekstrom et al. (US Patent 5376252) and Mets et al. (US Patent 3537889) further in view of Tomita et al. (US Pg Pub 20020040754).

17. Burns fails to disclose interlocking features. Tomita et al. (Fig. 1, 3) teaches aligning pins 233, 534, 535 for aligning and locking-in-place substrates between base layer and clamps. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with aligning pins as taught by Tomita et al. in order to provide alignment of the substrates and prevent relative movement.

18. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns (PG Pub 20030145894) in view of Kopf-Sill et al. (US Patent 5957579), Ekstrom et al.

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(US Patent 5376252) and Mets et al. (US Patent 3537889) in view of Takehiko (JP2002277478).

19. Burns (Fig. 5-9) discloses a method of producing segmented flow using a device comprising a first conduit 11 provided with a discontinuity 1 where it splits into two parallel inlet passages 9, 10 which provide immiscible fluid to merge at the intersection and cause segmented flow downstream of the discontinuity. Burns fails to disclose two substrates disposed face-to-face. Kopf-Sill et al. (Fig. 4) teaches a segmented flow device comprising of flow channels made by two substrates disposed faced to face and surface of one substrate profiled to define conduits. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns, with two substrates as taught by Kopf-Sill et al. as a convenient method of defining conduits in substrates. Burns or Kopf-Sill et al. fail to disclose substrates encased in casement layers. Ekstrom et al. (Fig. 9) teaches two layers of substrates 21, 23 having fluid passages defined in between and encased by casement layers 24, 25. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as modified, with encasement layers as taught by Ekstrom et al. in order to provide an outer protection for the substrate layers and keep them together. Burns as modified fails to disclose substrates disposed in a cavity formed by casement layers. Mets et al. (Fig. 2) teaches substrates 14, 15 disposed in cavities 11, 12 formed between casement layers 10, 13. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the flow device disclosed by Burns as

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modified, with cavities in encasement layers as taught by Mets et al. in order to provide a convenient location for placement of substrates. Burns fails to disclose the fluids flowing in intimate contact with each other. Takehiko (Fig. 1) teaches a microfluidic fluid flow device, comprising inlet passages 20A, 20B merging together causing the fluids from the first and second conduits flow parallel to one another and intimate contact with each other until they reach a discontinuity. It would have been obvious to a person having ordinary skill in the art at the time of the invention to have provided the device disclosed by Burns with a portion of the first and second inlet flows in parallel intimate contact with each other as taught by Takehiko in order to avoid mixing by preventing the fluid streams striking each other at an angle at the discontinuity.

Allowable Subject Matter

20. Claim 45 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art fails to disclose a fluid manipulation device comprising first and second ducts joining to form a third duct, the third duct being formed with a constriction causing the fluids to form into a flow of alternate segments, wherein the device comprises two substrates disposed face-to-face, the surface of one of the substrates being profiled such that the first, second and third ducts are defined between the two substrates, the surfaces of the third duct that, in use, comes into contact with one or both of the first or second fluid further comprising the substrates disposed within a cavity formed by the casement layers such that the depth of the cavity is less than the combined thickness of the two substrates.

Response to Arguments

21. Applicant's arguments with respect to the claims 21, 22, and 28 have been considered but are moot in view of the new ground(s) of rejection.

22. With respect to the claims 31 and 40, in response to applicant's argument that Mets is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Mets is being relied only to show prior art disclosure of substrates disposed in cavities of casement layers, which is analogous to Ekstrom et al. which (Fig. 9) discloses substrates sandwiched between casement layers.

Conclusion

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ATIF H. CHAUDRY whose telephone number is (571)270-3768. The examiner can normally be reached on Mon-Fri Alternate Friday off 9-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on (571)272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Atif H Chaudry/
Examiner, Art Unit 3753

/STEPHEN HEPERLE/
Primary Examiner, Art Unit 3753

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